The Victorian 6502 User Group Newsletter

KAOS

For People Who Have Got Smart

HARDWARE .. .. .. DAVID ANEAR
SOFTWARE .. .. JEFF RAE
FORTH .. .. DAVID WILSON
AMATEUR RADIO ROD DRYSDALE VK3BYU
EDUCATION .. .. JEFF KERRY
LIBRARY .. .. RON KERRY
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Eric Lindsay from the N.S.W. group has been busy writing to American companies who have advertised OSI software, to check if they are still supporting OSI. Aardvark, as we already know, is no longer supporting OSI and there were negative replies from Comp-U-Gamer, Microsoftware and Micronics. One suprise was the lack of response to two letters to Dwo Quong Fok Lok Sow regarding WP6502 as they are very big in 6502 in general. If anyone has heard from them lately can they please advise us.

One company, Micronics, have given him permission to sell five of their games for a low royalty. The games are Crossball, Break Out, Box In, BattleShip, and Hangman. They originally cost $10.00 each but Eric is offering the five for $16.95 if you supply a disk set up with 65D. This offer is only open to members with 5.25" disk systems at the moment, but Eric hopes to have 8" available shortly.

Also, for C1 systems only, he has Ray Lydon's OS65D 3.3 dos extentions, which include all the commands in COMPDOS 1.2, plus more. Up to 10 buffers, and many extensions for random file access, a print spooler, and details of how to bring your C1 up to 48K, and add another printer port at F100. Ray sells this for US$30 (see his advert in Micro's MicroBits over the past few months). Eric is selling it for A$30 (just send him a disk with your 3.3 on it) and it is yours. Again, all legal, not pirated. There is some chance that a C4 version will also be available sometime soon. Registered purchasers will also be able to buy source code at a very low cost in future.

The club has Superboard cases available again, see The Meeting Was KAOS for details. These cases are large enough to hold a power supply, video board, and expansion board.

The next meeting will be on Sunday 25th September at 2pm at the Essendon Primary School which is on the corner of Raleigh and Nicholson Streets, Essendon. The school will be open at 1pm.

The closing date for items for the October newsletter is 14th of October.

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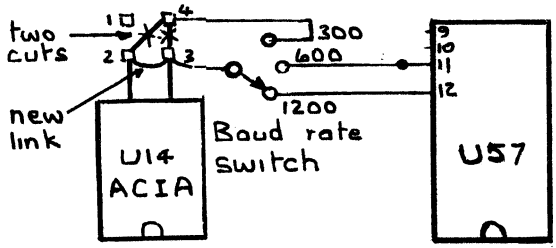
MY SUPERBOARD SERIES II. Part 6

by John Whitehead

My first attempt at a faster cassette interface was from an article in Personal Computing and it was not very satisfactory.



After I read the article by Ed Richardson in KAOS May 82, I removed the above and wired in Ed's mod as shown. I now record all my programs at 600 baud with a 2MHz clock without adding any extra nulls and it is always completly reliable. I can record at 1200 baud but this is not always reliable as it depends on the tape used.

One problem with ROM BASIC is it's garbage collection routine. Some strings are stored in Fre RAM area between the end of your BASIC program and the top of RAM. When this RAM has been filled up the garbage collector removes all redundent strings. The original routine does not work correctly and when it fails the screen starts flashing. As I have an EPROM burner this was easy to fix by replacing the BASIC 3 ROM with a 2716 EPROM as in KAOS July 82, using the code by Earl Morris in KAOS Dec 82.

After having Extended monitor in EPROM at $E800 for a time I found that some of its functions did not work correctly or were not convenient to use. The checksum loader was the worst in that when a faulty byte came in from tape the screen would scroll up and the address of the last line loaded was lost. Another not so obvious fault was that if the start of line semicolon was loaded as a faulty byte no error was detected and the whole line did not get into memory. I re-wrote the loader routine to fix the above faults.

Another improvement was to alter the two search routines to show the next occurrence of the search string as KAOS April 82. Other ideas for improvements I obtained from Peek(65). One of these was to get compatability with BASIC by changing zero page memory use to $50 to $57 and $D8 to $FF. The club has copies of Peek(65) journal.

By improving Exmon, same pockets of redundent code were left scattered in the 2k block and I could not use this space to improve other routines unless I could reassemble Exmon. The problem was how could I get Exmon's 2048 bytes into the Assembler without having to type it all in by hand. I overcame this problem by altering a BASIC disassembler I had to disassemble machine code into a form that the Assembler would accept. This BASIC program is now a Symbolic disassembler. I then made a tape of Exmon, fed it into the Assembler as a source file and removed the redundent code.

Exmon has the ability to display the contents of a location as ASCII using " but did not have the ability to directly put ASCII into a location. I have added this function.

Exmon is easy to relocate to any 2k of RAM using its own R routine. After relocating, the MS bytes of the address table at $0960 to $0999 have to to changed to the new address. E.G. If relocating to $1800 then change $1961 and $1963 from $0B to $1B, $1965 from $0C to $1C etc.

Exmon can be run in 48x12 by entering the monitor and changing $021A to $00 and $021B to $FB, running EXMON at $X800 and changing $00FB to $01 using the AT routine. The number of lines disassembled can be changed at $099D. To make a new copy of Exmon that can be loaded in BASIC use the Token load/Save program by A. Cashin, which is available from the club.

This improved version of Exmon has been available for some months on tape for $3 + $1 p&p from the club, in a 2716 for $10 or 2732 for $12 from myself.

THE MEETING WAS KAOS

by Michael Lemaire

Hail members, once again I have usurped King Corky -- just call me Macbeth, I suppose..but on to the meeting..

David Anear announced that this was indeed the thirty-third meeting of KAOS. Almost three years of mind-boggling feats and accomplishments! I can't wait for the birthday cake..

The much awaited Superboard cases have arrived. They are available from KAOS (ie. Ian) for $24 + $6 P&P within Ansett Air Freight delivery area. This includes the steel keyboard/top/rear (with all cutouts for sockets, fan etc.) and base sections, with 4 RCA sockets and a plan for the wooden sides thrown in for good measure. The sides are not supplied, so it's out with the woodwork tools, guys.

David showed off a 6502 programming card, containing all the mnemonics, opcodes and timing and other goodies all on a single multi-coloured, safe-for-kiddies, machine -washable, plastic-covered card which is available from Jarcar in Sydney for $13, but apparently it's not been easy for Jarcar to get hold of them, so they may not last.

George Nikolaidis (CompSoft) announced that the supply of those tiny switching power supplies had dried up, so unfortunately they are no longer available. However, the Apple clone switchers are still available. George and I (mainly George) have disassembled and commented Disk BASIC which now resides as some 6 source files on SDP, and it is planned to rewrite it, remove the bugs, and generally soup it up with enhanced features. David Anear suggested writing the enhanced version for the 65C02, so as to get around copyright problems, and to sell a 65C02 with each copy of the BASIC, to avoid a lot of pirating -- he's not just a pretty face.

David announced that that paragon of programming virtues "Beyond Games" now carries the title "Top-Down Machine Code Programming", so if you're after it, take note.

A status report was requested on the TAB uploading/downloading intelligent terminal program; it's not ready yet, almost but not quite.

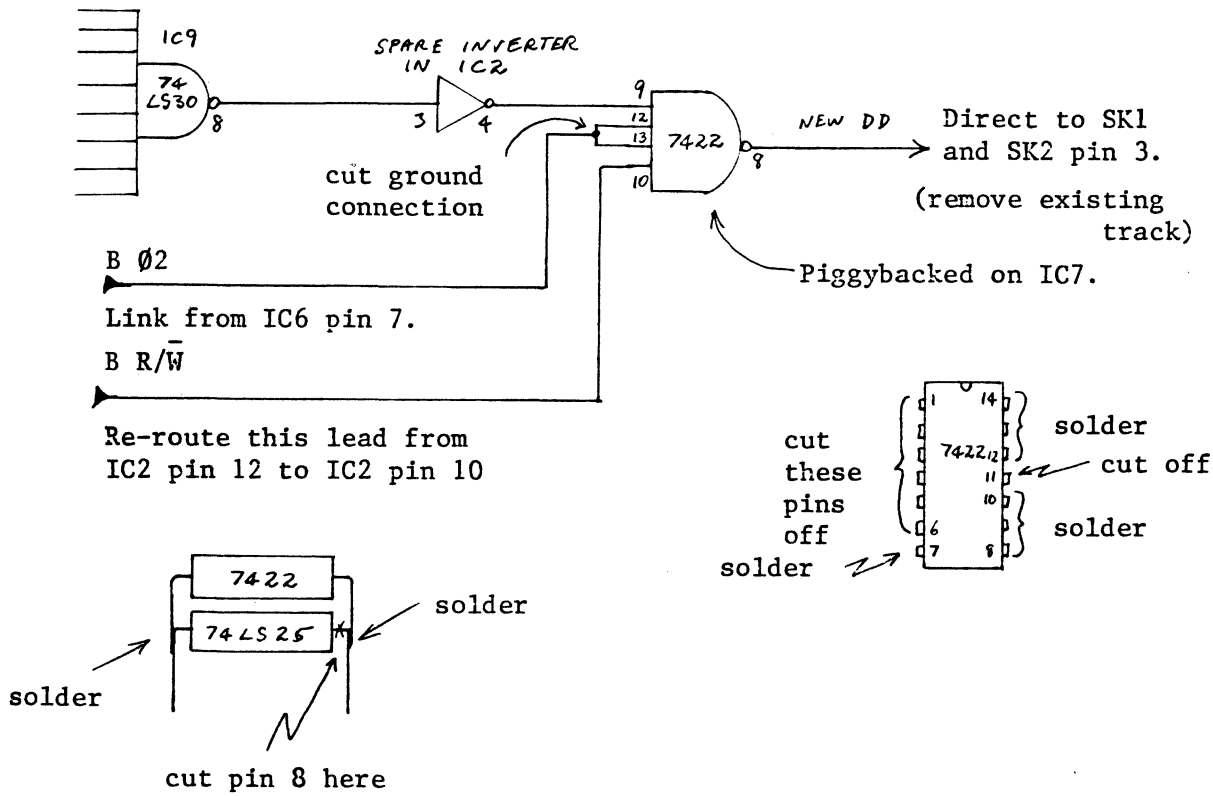
But the highlight of the meeting was the Rabble 65 gang, with a list of developments on what was a modest C4P replacement, OR SO WE THOUGHT...The cases have arrived for the main housing and the keyboard, but things are not yet ready for production--among other things, the production cases are to have enamelled off-white colouring, instead of the gunmetal case shown of by George which was running the new 8" lookalike drives. The keyboard is full ASCII, with a numeric keypad, 12 function keys, 4 editing keys, and 4 cursor keys. More exciting news is that the high-resolution colour graphics board is developing well. It uses the NEC 7220 intelligent graphics controller with 128K bytes of RAM -- the maximum graphics RAM is to be 512K bytes. Not exactly chunky graphics, at 1024x1024 pixels in 16 colours, with automatic drawing of lines, circles and characters done by the video chip. The "other" hi-res board is approaching the artwork stage. It is a lower resolution board, "only" 256x192 pixels in two colours (black and white), and it can be run at lower resolutions with more colours. The graphics are equivalent to those of the Tandy Colour Machine (using the M6847 chip). And even more....the Australian department of Trade have asked for the Rabble 65 to be exhibited at the International Trade Fairs in Germany and America next year.

Superboard

Sept.1983.

Newsletter of the Ohio Superboard User Group, 146 York Street, Nundah, 4012.

DD LINE MOD FOR RABBLE by Graham Gaiger.



On the 7422, cut off pins 1,2,3,4,5,6 and 11. Place the 7422 on top of the 74LS25 (IC7), making sure that the orientation of the chips is the same. Solder all remaining pins to the 74LS25 pins with the 74LS25 still in the socket. Try to solder each pin as quickly as possible, and do not apply too much solder or it will run down the lower pin and you won't be able to remove it from the socket.
Next, remove the piggybacked pair from the socket, and with a pair of small sharp cutters, cut pin 8 away from the 74LS25. Re-insert in the socket, taking care not to bend any of the pins.

Where tracks have to be cut, cut them as close to the IC sockets as possible. Finally, make sure that plated through holes do not bypass your track cuts.

When you have the circuit operating, your Rabble board will operate at 2MHz with the 8T28 buffers in place on the Superboard.

For further information if you have any problems, write to Graham Gaiger, Be sure to include a SAE.

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NEXT MONTH

Another project for the proto area on the Rabble board. Also a puzzle program for you to type in, and a challenge! Win $5. Also a review of the best M/C arcade game that I have ever played on the Superboard.

SOFTWARE REVIEW - *Labyrinth*

Aardvark sells this game as Labyrinth, but the real title is "Close Quarters" which is revealed within the program. Close Quarters is a sort of adventure/ arcade game, written in Basic, and about 6k long. It will run on either C1 or C2/4 machines, and with some small changes, will suit modified machines.

The game is really a graphics version of Hunt the Wumpus. Your mission is to explore a large labyrinth, searching for, and destroying the nine Iron Monsters who dwell within. In addition to an excellent 3D display of the interior of the maze, you have a computer rangefinder which gives you the direction of the nearest monster, and his distance from you in rooms.

As you hunt for him, and the rangefinder shows him drawing ever closer, you nervously reach for the firing keys. Usually just around a corner, his evil shape comes into view, turns to face you, and you only have a little time in which to aim between his eyes and fire. This is his only vulnerable spot.

If you miss, or are slow to fire, he slides forward and zaps you. You then dematerialise, and reappear in another part of the maze, from which you continue the hunt, but with one extra monster to contend with. A timer counts away, for those who like a measure of their performance, perhaps to compare with that of another player.

If you should get disoriented, something easy enough to do, you can display a map of the whole labyrinth, with your current position shown. There are fifteen levels of play, level 15 being extremely difficult. At this level, the monsters leap around the corner and are upon you. At 2MHz, you only have time to gasp!

As you may have gathered, I found the game a lot of fun to play. Labyrinth is available from Aardvark and Looky Video, and Library Members can personally assess it at the usual postage costs.

- -

HEAR YE HEAR YE HEAR YE

Be advised that this year's programming competition will run in January,1984. Entries may be in 24 x 24 format or 32 x 64 format, must run in 8k RAM, and may be on any subject, games, education, utility etc. Your programs will compete for up to $80 in prizemoney, and entrants receive all entered programs and vote for the winners.
The entry form will be included in the November KAOS, so now is the time to start getting some program ideas together. January is only 3 months away.

- -

FIVE BOOKS OF O.S.I.

The "books of OSI", 1 through 5, are available for OSUG library members to borrow. These are an inglorious mixture of items, promotions, and bits from the OSI Small Systems Journals and other sources.
I have to admit to being disappointed with the contents, however Brendan Vowles says there are items for disk users which he found illuminating. Books 1 to 3 are systems information. Book 4 is games programs, and book 5 has more programs, mainly disk based. Cost of the books was nearly A$50.00 and I'm very sure they aren't worth that!
Postage is one 27¢ and one 70¢ stamp per book to borrow. Please specify which number book(s) you want.

- -

WOOPS

Some errors in August SUPERBOARD. On page 4, under Variables Used, change:- P$ to CH$, A$(R) to N$(R), D to P(D) and line 45 to line 15
In the program on page 5, in line 1Ø change FORD+Ø to FORD=Ø, and in line 65 change IF N<1Ø to IF N<11.

Ed Richardson.

QUEENSLAND USER GROUP MEETING. 14/8/83

Attendance: 20 members, 3 guests. Computers: 5 working, 1 not.

The meeting opened at 12 noon. Brendan Vowles was to give a demonstration of The Australian Beginning, and I had advertised this fact when informing members about the meeting. Brendan had planned the demo for a couple of weeks and had left nothing to chance. TAB management knew of the meeting, and considerable time had been spent beforehand to get to know the system well. It was not to be! Some urgent phone calls established that TAB had decided to upgrade the system and it would be down until 1.30pm. It was still out at 6pm. Brendan attempted to contact MICOM as an alternative, but with only one line, and on a weekend, this proved unsuccessful. I fancy there won't be a great rush to join TAB after that fiasco.

Pouring himself a stiff one from the Cafe Bar machine, Brendan launched into an apology for the stuff up, and proceeded to give an interesting short talk on databases both here and in the U.S.A., and the facilities and expenses offered by the MIDAS and AUSTPAC systems. Then, retiring into a corner, he attempted to outwit a new adventure game. Even with considerable help, by 5.30pm it was decided that for the time being, the game had won.

Bernie Wills answered some questions about Eprom programmers, and gave interested onlookers some demos of the various interfaces fitted to his machine. One of the most interesting was the Basic eprom programmer routine. Bernie had it in eprom and downloaded it into ram from the programming socket; a nice touch.

Robin Wells and Paul Brodie were busy checking out the contents of some games disks that Paul had received from Ken McNeill. Ken has upgraded to a BBC and is busy interfacing his ex-OSI disk drive to it. Robin and Tony Morton got together on a problem that Tony was having with his disk based wordprocessor. Robin also announced that details would be forthcoming on how to connect up the OSUG Modems. A circuit to convert the output to present day standards was under development.

Doug Robinson's style was cramped by an intermittant 2114 high in his memory. More bad news from Ian Mackenzie:- another of his school ClPs wasn't working. This one wouldn't load. Rats, another job for me.

Harry Moores sorted out some problems with his wordprocessor. He has a Star printer and was denied a technical manual on it. Can anyone assist?

Trevor Stephenson showed us his completed M/C trace routine.

The meeting closed at around 6pm. Next one will be in November sometime.

ROUTINE MAKES CENTS

from O.S.U.G. newsletter 6.

To get a program to print out results in dollars and cents, try this routine:-

```
1000 N$=STR$(N):IFN/100=INT(N/100)THENN$=N$+".00"GOTO1020
1010 IFN/10=INT(N/10)THENN$=N$+"0"
1020 PRINTN$:REM  N=Number to change to $ & ¢.
```

64 CHARACTER VIDEO USING THE 6545 CRTC.

B. Wills.

These notes provide further information about a 64 character video board built by John Burnham and myself, first mentioned in KAOS by Ed after one of the OSUG gatherings in Brisbane. The circuit was based on info in two sets of Synertek Application Notes, AN3 and AN4, obtained with the 6545 ic's from Energy Control, PO Box 6502, Goodna, 4300. Anyone seriously interested in building the board should refer to these Notes and the Synertek Data Catalog - the 6545 is capable of far more than is exploited in our board.

The 6545 is a 40-pin cathode ray tube controller, which generates all signals for scanning video memory and provides control signals such as vertical and horizontal sync. It is used in the Microbee, and the U.K. magazine "Practical Electronics" is to publish a design using the 6545 as part of its "Ultimum" series. The chip can be used with up to 16K screen memory, read the keyboard, give split screen displays & drive a light pen. However, our circuit does none of these - it is very basic, reflecting what we thought of the chances of success when starting. The main advantage of the design is that it has the same video memory map as the C1 and C4 (switchable), and doesn't cost a heap.

If interested, several features should be considered prior to starting.

1. The 6545 requires a short initialisation program. This was put in Eprom, but could probably be done by a disc load. No screen display occurs at all until the routine runs, but then the CRTC works until re-programmed or power fails. BREAK doesn't have to upset it, although in our case, initialisation was achieved by reburning the monitor to jump to the routine when BREAK was pressed (and at power on for Series II), and then jumping back to the rest of the C1 start-up ending with D/C/W/M ? (Takes 47 bytes). The code was written as sub-routines, so that a 24 character screen (normal C1) can be called up from 64 character mode by software, and vice-versa. Two monitors were used, in one 2732, selected by taking pin 21 high or low. Several months of use has shown that the 64 char screen is used mostly, and the ability to call up a 24 char screen in a program has never been used. If 24 style video is wanted, just switch to other monitor.

2. There is no p.c. board. One board was built entirely by wire-wrapping, and the other was a mixture of wrapping and point to point wiring with soldering. Wire-wrapping was the easier method, but is more prone to later damage when removing boards and playing around. Be prepared for some trouble-shooting.... earthing, shielding of clock signals, layout and programmable display parameters may need fine tuning. Access to a CRO, and at least a logic probe, is recommended. The logic probe from E.T.I., July 1979, p.71 works OK up to about 4-5 MHz.

3. If your video display won't handle 64 characters, a 48 char display is readily obtained. Our boards were originally 48 chars, using an 8 MHz dot clock obtained by doubling the processor clock using the circuit in KAOS Vol. 1, No. 1. They were later altered to 64 chars, by adding a 10 MHz oscillator. This gives 80 characters, but only 64 appear on the screen of the TV's, fed with direct video.

4. As with any screen mods, the scrolling, editing and other display functions of the monitor Rom must be altered. I have seen DABUG monitors advertised in KAOS, to suit 24 x 48 with C1 keyboard, but not 24 x 64, which seem to have C4 keyboard. Changes to 24 x 24 Cegmon to suit 64 chars are not numerous. Perhaps not a bad idea to build an eprom burner first.

Address decoding.

As the CRTC requires 2 locations in the memory map, it needs decoding. The design uses $C400-C5FF, wasteful of space but that wasn't a problem. A latch which controls the dot clock frequency and character generator selection lives from $C200-C3FF, although it requires only 1 address. These chip-selects could be obtained by further decoding $C010-C01F on the Rabble board, such as by a 74LS139. Maybe the circuit could be built in the proto area of the Rabble board (you would have to be keen) , if you were prepared to put the chargen and video ram in spare Rom space. However, these chips must be isolated from the system data bus, by 8T28's in our case, and from the address bus, so a fair bit of butchery would be needed.

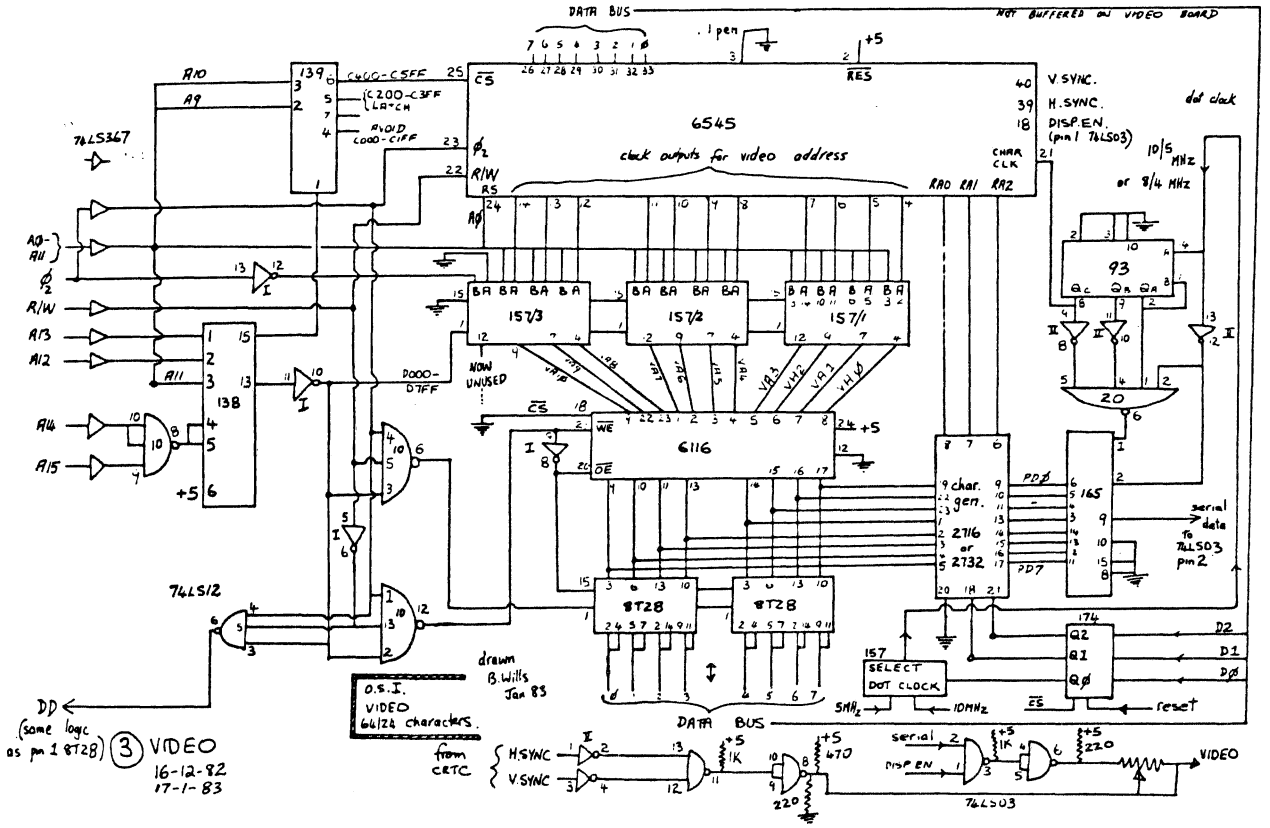
Circuit diagram.

The diagram accompanying this article grew as the board was modified, and probably will not come out too well after size reduction. There are about 3 other sheets showing how one board was set out on Veroboard. All diagrams are obtainable from OSUG or the writer
You will need to supply a 9 x 4 sase, and in my case, to cover photocopying costs with a 30¢ stamp.

How it works.

There is still some mystery concerning how the 74LS20 does its job, and no doubt the experts could come up with timing diagrams to explain it, but the wiring around this part was lifted straight from the Synertek data. The rest is not quite so bad. Either the 6545 or the 6502 provides address info to the video Ram (6116), as controlled by the 6502 wanting to read or write to the 6116. The 74LS157's do the switching, just as with the C1. The 8T28's isolate the output of the 6116 from the system bus unless the 6502 wants to R/W. The chargens, shift register (74LS165) and composite video mixing (74LS03) are almost a copy of the C1 circuit. Another 74LS157, controlled by the latch 74LS174, selects either 5 or 10 MHz dot clock which is divided by 8 (74LS93) to give the character clock signal. Other outputs of the LS174 select between one of 4 character sets in two 2732's. (This is not shown fully on the circuit but there is an inverter between pin 18 of the two 2732's, so that only one is selected according to the logic state of the Q1 output). The initialisation routine automatically selects the correct dot clock output for the monitor Rom in use - 10 MHz for 64 chars, and 5 MHz for 24 chars. The 24 x 24 display is slightly smaller than normal on the C1, as a result of the higher dot frequency, but this is to advantage as there is a good margin all around, and 32 characters across could probably be obtained if the monitor Rom was so instructed. A DD signal was generated as shown (74LS12) and it worked perfectly until the Rabble board appeared. No DD signal is now used anywhere in the system, and the 8T28's normally put next to the 6502 have been replaced by header plugs. 2 MHz operation appears OK without these buffers, although you might not believe it if you saw the amount of 40 conductor cable around. First versions used the C1 clock, run via shielded cable to the frequency doubling circuit on the video board. It was found that the cable should be earthed only at one end (video board), as if earthed at both ends, a herring-bone pattern was superimposed on the screen. The 24 x 24 display showed spurious dots for some characters. This was cured by connecting a 500 pf capacitor from the character clock line to earth. (Also worked from the buffered DØ line to earth, but don't know why). This was evidently a timing problem of some type, but we were not able to cure it by altering layout or the programmable delay feature of the display enable signal...see later comments about this matter. The spurious dots are still present when power is switched on from cold, but disappear after about 30 seconds warm-up. Any ideas on this problem (or former problem) are welcome.

Continued Next Month



MICRO ON THE OSI

Reviewed by Ron Kerry

> "This book is a compilation of articles that have appeared in MICRO magazine as well as newly written material that appears for the first time in this book. Categories covered are Basic Enhancements, Machine Language Aids, I/O, Hardware and Reference."

Edited by Kerry Lourash, who has contributed an article to KAOS magazine (see "Smart Lister" KAOS Vol.3 No.4 - also included in this book), the book contains 24 articles in 190 pages, soft covers. It contains many useful utilities.

A long awaited article is contributed by Colin and Jeff Macauley, titled "Extended OSI Basic", this article was mentioned at a KAOS meeting some time ago, but until it reached print in MICRO, could not be released. It allows the user to add statements to the standard Basic. Code has to be written to support your new statements of course.

Although many articles are reprints of those that have appeared in MICRO magazine, on balance, at $US 19.95 + P&P, it is probably a good investment if you don't have access to the magazines.

The address to write to is: MICRO INK
PO BOX 6502
AMHERST, NEW HAMPSHIRE 03031
USA

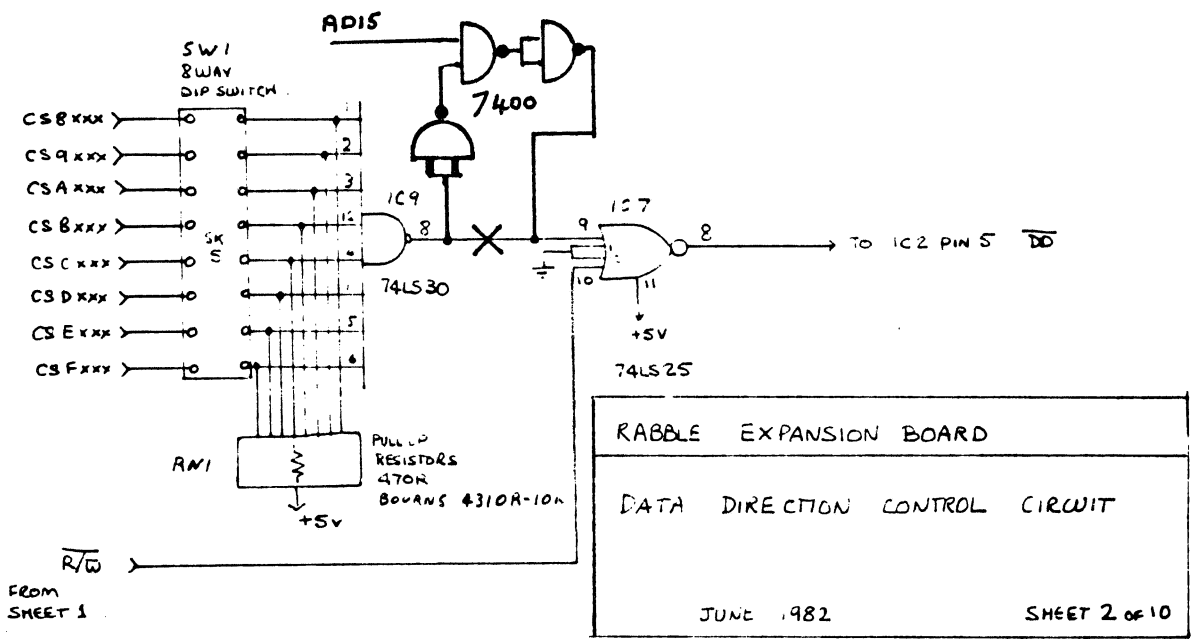
This circuit and the one on page 4 were received on the same day so we have printed both of them, you can decide which one to use.

DD LINE MOD FOR RABBLE EXPANSION BOARD

by M. Ogden

Modification alters operation of data direction control circuit. Present mode is to deselect the expansion board via the 8T28s on the main computer board. Operation is now reversed and the expansion board is only selected when required. AD15 line has been introduced to enable the first 32K on RAM on the expansion board. The DIP switches also function in the reverse mode: ie. "ON" to enable address locations on the expansion board.

Implementing the modification is simple. The 7400 can be installed on the proto area. If sockets are installed the track between IC 9/8 and IC 7/9 cannot be cut very easily, so cut or lift pin 8 on IC 9 and wire to the 7400. The output of the 7400 can then be wired to IC 7/9 directly. AD15 can be wired from the input buffers.



THE RABBLE 65

by Bill Chilcott

The Rabble 65 is a computer designed to meet the needs of both the amateur computerist and the small business. The Rabble 65 is able to meet these requirements and provide also for future expansion without the need of costly add ons, that many of our competitors regard as normal. Features of the Rabble 65 are as follows:

CPU 6502 running at 2MHz
RAM 48 Kbytes of low power static RAM
ROM 56 Kbytes including 3 x 16K pages
VIDEO 6845 CRTC, includes 4K character generator and software selectable screen formats of 80 x 25 or 64 x 32.
MONITOR ROM CRA-65 Provides full machine code facilities, and auto boot for the desired screen format and selection of ROM or disk based operating systems.
KEYBOARD Full size typewriter style keyboard with a numeric keypad and function keys, cursor controls are standard on the 94 key keyboard.

FLOPPY DISK CONTROLLER Will control two double sided drives or four single sided drives. A data separator and dc motor controller are standard. The recommended disk drives for the Rabble 65 are Mitsubishi 5.25" M4854. Other drives can be used, without modification.

POWER SUPPLY Switch mode sealed unit, provides +5, +12, -5 and -12V. Sufficient to power a fully populated board and two M4854 drives.

CENTRONICS PARALLEL PORT

RS232 SERIAL PORT With software selectable baud rates of 75 - 9600 baud.

CASSETTE I/O Kansas City standard at 300 baud.

18 PIN I/O BUSS To provide interface to EPROM programmer, HiRes colour graphics board, speech synthesiser, sound generator, CPM card.

50 WAY EXP. PORT For DMA or multiprocessor applications.

SOFTWARE All systems will be provided with a Monitor programme, RA65. This provides automatic system start up on RESET for one of the following:

DISK BOOT in 80 x 25 or 64 x 32 screen format
ROM BASIC in 64 x 32
ROM FORTH in 64 x 32
MONITOR in 80 x 25 or 64 x 32 Screen format
SERIAL TERMINAL 80 x 25 format
USER RESET - STARTS AT $E000 The reset routine is selected by a DIP switch on the CPU board.

The monitor provides many features of which some are:

EXAMINE MEMORY - (with ASCII Text Value Table) - ALTER MEMORY - GO TO - DISASSEMBLER - VIDEO SWAP - SERIAL I/O

Disk operating system currently available or soon to be released is:

COMP-DOS 1.3

FORTH (also in ROM) - BASIC (also in ROM) - SDP (Software Development Package - Assembly language) - PASCAL

Many programmes are also available for the Rabble 65 including games, educational software, business applications and utility routines.

CASE A two part system, with a keyboard and combination CPU and disk drive enclosure. The cases are made of heavy gauge aluminium, providing a sturdy cabinet and RFI immunity. The cases will hold a pair of 5.25" drives.

COSTS The Rabble 65 can be purchased in many forms:

Bareboard, manual, character and Monitor ROM	$ 150.00
Full kit of parts (all components including sockets and RAM)	$ 350.00
Keyboard	$ 150.00
Switch mode power supply	$ 100.00
CPU and Keyboard cases	$ 135.00
Technical manual	$ 10.00
16K, BASIC in ROM minimum system (no power supply or case)	$ 495.00
48K single M4854 drive, complete system plus software	$1650.00
48K twin M4854 drives (1MB) complete system plus software	$2125.00
SOFTWARE	
COMPDOS	$ 35.00
SDP	$ 65.00
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THE BEGINNING MACHINE LANGUAGE PROGRAMMER Part 15

by David Dodds

During the last month I was reviewing progress in BMLP; 47 instructions and 9 addressing modes in 14 lessons is not bad going!
The graphics composer ARTIST being discussed in the series uses nearly everthing covered so far and a bit more yet to come. As such it is well worth studying.
In case you missed the announcement last month the source for ARTIST is available through the club.

I do not intend to cover all the routines in ARTIST as this would require too much time to complete. In the last few articles in this series I will be covering only the routines which introduce new instructions or are of some special interest.

Last month we were talking about delay loops. To finish off that section, a note about timing when page boundaries are crossed. A number of instructions notably the BRANCH and some Indexed instructions take longer to execute when a page boundary is crossed. For example the code

```
1BFE FRED  DEY
1BFF       BNE FRED
1C01       DEX
1C02       BNE FRED
```

will take longer to execute than

```
1C00 FRED  DEY
1C01       BNE FRED
1C03       DEX
1C04       BNE FRED
```

even though the two routines are identical. While this normally would not matter, if a precise delay is required then the difference could be critical.

A timing problem of a different kind appears in the blinking cursor routine in ARTIST.
BLINK, the cursor blinking routine is called by GETKEY, the keyboard scanning routine.

The blinking cursor is simply achieved by alternating between the cursor character, the underscore ($5F) and whatever is under the cursor. The only complication which can arise is that the cursor character itself may be under the cursor. Unless some provision is made for this the cursor will appear to stop flashing. The obvious solution is to test for this situation and substitute a space for the cursor if the character is the underscore.

A quick calculation of the timing of GETKEY indicates that it will call BLINK around 10,000 times each second. A blink rate of around 2 cycles per second is about right so BLINK only need swap between the cursor and the character under the cursor once in every 5000 passes or so.

To achieve this reduction a 16 bit counter (actually only 12 are used) called BLink.FLaG or BL.FLG is used. Each time BL.FLG becomes zero the character under the cursor and the cursor are exchanged and BL.FLG is reset.

The program for BLINK is:

```
BLINK   DEC BL.FLG
        BNE B1
        DEC BL.FLG+1
        BNE B1
        LDA #8              ; reset blink flag
        STA BL.FLG+1
        LDY #0
        LDA TVTEMP          ; TVTEMP contains the character
        CMP (CURPOS),Y      ; under the cursor
        BEQ U.LINE          ; character was an underscore
        BNE B0
U.LINE  LDA #USCORE         ; check if current character
        CMP TVTEMP          ; is an underscore
        BNE B0
        LDA #$20            ; substitute a blank
B0      STA (CURPOS),Y      ; put new character on screen
B1      RTS
```

MODEMS AND PSUEDO C4P

by David Nicholls

My major application has been to use the Superboard as a terminal to a mini at a number of educational institutions. I had installed the three way switch for the cassette/modem/printer as described in the Ohio literature. I had done this work myself and it had taken me several months to organise a Dick Smith Dataphone (modem) and to pluck up the courage to actually test the modified board. I had pessimistically counted all the things that could go wrong, the computer, the modem routine from Ohio, the modem, Telecom, and the mini, but all worked the first occasion I used it.

I now have the Superboard routinely working to a PDP 11/40 and to a VAX. The 24 characters/line were just to hard to read and the 48 characters from the DABUG was not right. The line always started in the middle of the screen, and inevitably, since most lines were more than 24 characters long they went on to the next line and legibility, while improved, was not good enough.

So, off to COMP-SOFT! I had my Superboard upgraded with a TASAN Video board and a Rabble Expansion board. With great expectations, I set out to try the modem program again, but although the program loaded, I could not get any response from my host mainframe and the control-B would not release me from the modem routine.

I cried on Rosemary's shoulder and she gave me an address in the far north of the state. After procrastinating for a while, (who would listen to my problems?), I wrote to Michael Young. Presto, a phone call and a laconic and modest voice tells me he has solved my problem; "take down this line and it will work". It only took a minute or two to type in the new line and run the modified routine. Another few moments to connect to the host mainframe and at last I really do have a ledgible screen of 64 characters from the VAX.

As I understand the problem, the modem program goes off to find the UART where it should be for a C1P machine, fails to find it and hangs. I had forseen this kind of possibility but was reassured by the markings on the Ohio modem routine tape which says "C1P/C4P".

With all the credit to Michael Young, I give the necessary new line for the cassette tape SCX-107 Modem routine.
INSERT:

```
4065 POKE 64512,3:POKE 64512,17: if PEEK(64513) <> 0 THEN 4080
```

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Contact Shad Ali,

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have for sale: 1 used C4P in working order for $195
4 Toshiba converted TVs as is for $20 each.
1 C3 OEM twin 8" disk system, Zenith Z19 terminal, OS65U, CP/M, DBMS, Cobal and Fortran at $2995.

ITEMS OF INTEREST

The "Australian" newspaper is running a series of articles about computing on the last page of the Saturday issues. Usually there are a couple of items of interest, and a program written in the most general form of BASIC which can be readily modified for any machine.

Computing Today magazine for June ,83 has an interesting item on music generation for the UK101 (which is based on the Superboard).

Due to the demand for printers, the Alpha 80 advertised in the July issue of KAOS for $495.00 will be available at the same price until October 31st.

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